TC537C69R481990c.1

The Habitat Restoration Group

REVEGETATION AND MONITORING PLAN FOR THE ESTABLISHMENT OF RIPARIAN TREES AND SHADE LEVELS ON COYOTE CREEK REACHES 1B AND 2A

Prepared by

JOHN STANLEY AND ASSOCIATES, INC.
The Habitat Restoration Group

William J. Lapaz, Revegetation Specialist
Michael S. Marangio, Environmental Analyst
Linda A. Spahr, Environmental Horticulturist
William L. Elsey, Fishery Biologist
John T. Stanley, Principal
Ambessaw Assegued, Revegetation Planner
Jeff Caldwell, Revegetation Planner

SANTA CLARA VALLEY WATER DISTRICT
LIBRARY
[illegible] ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118

Prepared for

SANTA CLARA VALLEY WATER DISTRICT

James Fiedler, Division Engineer
Dr. Bernard Goldner, Environmental Specialist

June 12, 1990
Revised: December 14, 1990

File No. 182-33

Telephone (408) 439-5500 • 6001 Butler Lane, Suite 1 Scotts Valley, California 95066 • Fax (408) 438-1142
California Landscape Contractors License # 571037

TABLE OF CONTENTS

Page Number

Introduction 1

Goals of Revegetation 2

Site Description 3
  Areas to Be Revegetated 3
  Soil Conditions 4
  Water Conditions 5

Constraints to Successful Revegetation 6

Revegetation Materials 7
  Plant List - Reaches 1B and 2A 7
  Recommended Propagules and Availability 7
  Substitutions 9

Planting Design and Layout (Planting Plan) 10
  Plant Associations 10
  Amount of Propagules Required 12

Installation Guidelines 14
  Purchase, Transport, and Storage of Plant Materials 14
  Installation of Herbaceous Groundcover by Seeding 15
  Installation of Container Plants, Cuttings, and Transplants 15
  Weed Control 16
  Plant Protection 16

Establishment Period Maintenance 17
  Irrigation 17
  Maintenance of Watering Basins 18
  Weed Control 18
  Plant Protection 19
  Debris Removal 19
  Supplemental Planting and Seeding 19

Monitoring of Revegetation Success 20
  Success Criteria 21
  Monitoring of Shade Levels 22
  Methods 23

TABLE OF CONTENTS (Cont'd.)

Page Number

Related Monitoring Programs 24
  Monitoring of Groundwater Quality 24
  Monitoring of In-Stream Water Quality 24

References 25

LIST OF TABLES

Number Page

1 Container Plants for Revegetation of Coyote Creek Reaches 1B and 2A 8
2 Herbaceous Groundcover Plants to Be Seeded at Revegetation Sites in Reaches 1B and 2A 9
3 Amount of Container Plants and Cuttings Required for Coyote Creek Reaches 1B and 2A 13
4 Irrigation Schedule 18

LIST OF FIGURES

Number

1 Vicinity Map
2 Revegetation Map
3 Emergent Vegetation Map
4 Container Plant List
5 Cross Section F-F, Benched Island, Area 1B-3
6 Planting Detail - Planting Method #1 on Level Ground
7 Planting Detail - Planting Method #1 on Slope
8 Planting Detail - Planting Method #2 on Level Ground
9 Planting Detail - Planting Method #2 on Slope
10 Planting Detail - Pole Cutting Planted on Slope
11 Planting Detail - Short Cutting Planted on Slope
12 Planting Detail - Emergent Vegetation

INTRODUCTION

This revegetation and monitoring plan is prepared in response to Special Condition Number 3 of the U.S. Army Corps of Engineers Permit Number 15336S12A for construction of Reach 2 of the Lower Coyote Creek Flood Control Project (dated June 16, 1989), Condition Number 4 of California Department of Fish and Game (CDF&G) Stream Alteration Agreement No. III-204-88 (dated March 25, 1988) and Condition Number 10 & 11 of CDFG Stream Alteration Agreement III-1421-88 (dated June 28, 1989). The plan addresses the revegetation and monitoring of 2.36 acres in Reaches 1B and 2A of Coyote Creek. This report is focused on a small portion of the Revegetation Project that is being planned and implemented in Reaches 1 and 2 of Coyote Creek.

The project area is situated immediately east and north of the San Jose/Santa Clara Water Pollution Control Plant sludge ponds, south of the Newby Island Solid Waste Disposal Site, and west of Highway 880 in Santa Clara County, California (see Figure 1).

During the Fall of 1989 a revegetation and soil reclamation project (Phase 1 Revegetation) was implemented in Reach 1. The purpose of Phase 1 was: (1) to reduce soil salinity and set the stage for Phase 2 of the revegetation project in Reach 1B; and (2) to plant native vegetation in the recreated pickleweed marsh and adjacent levee areas (Reach 1A). The purpose of Phase 2 of the revegetation project will be to enhance the work completed in 1989 under Phase 1, and to install native groundcovers, shrubs and trees both in Reach 1B and 2A. Installation of herbaceous groundcover seed will take place during the Fall of 1990, while planting of native shrubs and trees will occur in the Winter of 1990 and Spring of 1991.

This report will address only that portion of the Phase 2 Revegetation Project that will establish riparian plant communities in areas directly adjacent to the Coyote Creek channel (near the old Standish Dam site) intended to provide aquatic shading of Coyote Creek. Contract Specifications for Phase 2 Revegetation of Reach 1 are currently being prepared and will be finalized by December of 1990.

GOALS OF REVEGETATION

Mitigation for brackish marsh habitat lost with the removal of a 3000-foot meander of Coyote Creek (as described in SCVWD 1984) during flood control construction included the creation of additional channels in a delta configuration in Reach 1B. Delta associated islands will be revegetated for a variety of wildlife purposes and as mitigation for tree and fishery habitat losses (John Stanley and Associates, et al, 1989). In Reach 2A, the purpose of revegetation is mitigation for the loss of riparian vegetation and resultant loss of stream shading (aquatic shading) due to construction of flood control features.

The following goals are recognized for the revegetation areas in Reaches 1B and 2A:

1. Promote the establishment of fish habitat along the margins of the re-configured Coyote Creek channel in Reaches 1B and 2A by planting trees to shade the channel.

2. Provide habitat for wetland-associated wildlife species on isolated islands in Reach 1B. These habitats include:

    a. Tree nesting habitat for herons and egrets.

    b. Upland grassland habitat for ducks, Canada geese, saltmarsh yellow-throats, tri-colored blackbirds, and other migratory and resident birds and small mammals.

3. Promote amphibian, invertebrate, fish, bird and small mammal habitat along the delta islands and channel margins by encouraging recolonization of emergent vegetation in Reach 1B.

4. Compensate for riparian tree losses within Reaches 1B and 2A by planting riparian tree species on the eastern-most delta island and along the main channel of Coyote Creek.

5. Restore native plant species that were lost as a result of flood control construction and other prior land disturbances, and where feasible, collect plant propagules on-site.

6. Re-introduce native plant species that historically grew on this site.

SITE DESCRIPTION

AREAS TO BE REVEGETATED (See Figure 2)

Area 1B-3: Delta Island. This is the most easterly of the pair of islands, and includes two benches to be revegetated with riparian forest. Total island area: 2.6 acres; area to be revegetated with riparian forest: 1.08 acre.

Area 1B-5: This is a wide bench between the main channel of Coyote Creek and the E-line road that runs in front of the old Milpitas Sewage Treatment Plant. Total area: 0.32 acre.

Area 2A-1: This area along the east side of Coyote Creek is to be revegetated with mixed riparian forest for aquatic shading. Total area: 0.04 acre.

Area 2A-2: This area is located along the east side of the creek, approximately 50 feet south of Area 2A-1. It is to be revegetated with mixed riparian forest for aquatic shading. Total area: 0.13 acre.

Area 2A-3: This area is located on the west side of the creek adjacent to the north bypass entry at West Station 9+40. This area to be revegetated with riparian forest for aquatic shading. Total area: 0.04 acre.

Area 2A-4: This area is located on the west bank of Coyote Creek directly south of Crossover #1. It is to be revegetated with mixed riparian forest for aquatic shading. Total area: .26 acre.

Area 2A-5: This area is located along the east bank across from Area 2A-4, directly south of Crossover #1. This area is to be revegetated with mixed riparian forest for aquatic shading. Total area: .49 acre.

SOIL CONDITIONS

Reach 1B

Surface soils of the project area consist of silty loam and silty clay loam. Soil excavated on the project site was used to construct the islands. Soil in Area 1B-5 is generally undisturbed, except that vegetation was removed. Soil in Area 1B-3 was compacted to 90% during construction.

Soil samples obtained from the project area show high concentrations of neutral soluble salts. Soil pH tests indicate alkali soil with values characteristically higher than 8. Of greatest concern are high concentrations of sodium and boron, which impose severe limitations to plant growth and vigor.

The soils found on this site are considered to be "saline-sodic", i.e., having E.C. (electrical conductivity) values of 4 mmhos/cm or greater, and E.S.P. (exchangeable sodium percentage) values of 15% or greater. Laboratory results indicate that the E.C. values in Reach 1B range from 3.8 mmhos/cm to 14.9 mmhos/cm, and E.S.P. values ranging from 28.6% to 46.7%.

During Phase 1 Revegetation (in 1989) of Reach 1B, soil reclamation consisted of incorporation of gypsum and soil sulfur and seeding with annual barley. In addition, soil preparation on the benched area of 1B-3 has been expanded to include ripping up to 2 feet deep and the importation of 1 foot of non-saline alluvial topsoil salvaged from the Reach 2 construction site.

Reach 2A

Reach 2A revegetation sites have the same problems as Reach 1B sites, although with less severity. Conditions for plant growth improve upstream as distance from the southern end of San Francisco Bay increases. The soils in Reach 2A revegetation areas are native, although they have been cleared of vegetation. Analysis of soil and channel water samples indicate lower salinity levels than in Reach 1B. The existing vegetation in this area is composed of a relatively healthy, narrow strip of remnant riparian forest adjacent to the creek channel.

WATER CONDITIONS

Irrigation water can be obtained by pumping out of the seasonal lake created behind the temporary dam placed across the delta portion of Coyote Creek in Reach 1B from May 1 through October 15 of each year. The water quality of Coyote Creek is considered guardedly suitable for irrigation of native riparian trees and shrubs; salinity levels of irrigation water will be monitored during the plant establishment period.

Between October 15 and May 1 when the dam is out, the tidal flows extend inland to Coyote Creek Reach 1B. Preliminary surveys of the salinity of tidal water in this portion of Coyote Creek suggest that the water contains approximately 10 ppt (parts per thousand) to 17 ppt salts near the delta island (John Stanley and Associates, et al, 1989), of which 90% or more is thought to be sodium (H.T. Harvey, personal communication). Groundwater and channel water are currently being tested as part of the on-going monitoring program for Coyote Creek (The Habitat Restoration Group, 1990).

Coyote Creek water will be used for irrigation throughout the plant establishment period. Reclaimed water from the San Jose/Santa Clara Water Pollution Control Plant may be used as needed during the establishment period when the seasonal dam is not in place.

CONSTRAINTS TO SUCCESSFUL REVEGETATION

Reach 1B

The major constraints to successful revegetation in Reach 1B are the high soil salinity, poor soil structure, fluctuating height and quality of the groundwater, and the unreliable quality of Coyote Creek water for irrigation use. The timing of the groundwater fluctuation compounds the adversity presented by the site. A high, fresh water table will be present during the warm season while the seasonal dam is in and a lower, more saline water table will be present during the cool season when the dam is out and tidal influence is exerted. This pattern is the antithesis of that found in a natural, riparian system.

Upward movement of dissolved solids from the groundwater may eventually be a problem in Reach 1B, especially after irrigation is discontinued. These factors lead us to question the ultimate success of revegetation in this area, even with the addition of one foot of non-saline topsoil and other reclamation efforts on the benches in Area 1B-3. It is expected that growth and survival rates will be depressed and that usual standards of success will not be fully met.

Reach 2A

The constraints to successful revegetation in Reach 2A are the same as for Reach 1B. However, the level of soil salinity is less and the areas are typically not severely compacted. The revegetation efforts in Reach 2A are expected to be reasonably successful.

REVEGETATION MATERIALS

PLANT LIST - REACHES 1B AND 2A

Appropriate plant species to be installed from container stock have been divided into groups of trees, shrubs, and herbaceous plants (see Table 1). All of the plants are native to the area except Brewer's saltbush, which was included because of its salt tolerance and wildlife value.

The container plant selections for Reaches 1B and 2A were developed with salt tolerance as an important criterion. Therefore, certain species, common to the riparian vegetative community and normally included in areas with more favorable site conditions, are not included for use on this site.

Herbaceous groundcover mixes will be installed in Reaches 1B and 2A to provide physical stability to the soil, prevent soil erosion, to help organic matter build up in the soil, improve edaphic conditions, provide wildlife cover and to establish a multi-layered vegetative community. Again, most of the species selected for installation are currently or historically native to the site, and many will be hand collected on-site or in the vicinity of the project site (see Table 2).

RECOMMENDED PROPAGULES AND AVAILABILITY

A mix of different plant species and propagules will be used for different planting areas. Seed, container stock, pole and short cuttings will be utilized to establish plant cover, with the possible addition of transplants of emergent vegetation.

Propagation material for several plant species will be collected on-site or from nearby localities, because local plant materials are better adapted to the soil and climatic conditions of the site, and survival is expected to be better than if other sources were used. The use of locally obtained propagation materials will also protect the genetic integrity of existing populations of native plants found on and around the project site. Propagules of cottonwood, four species of willow, blackberry, golden aster, Douglas' Baccharis, wild licorice and mulefat will be collected on site. Rhizomes of emergent vegetation shall be collected in nearby waterways subject to similar tidal regimes. In addition, some seed for the groundcover seed mix will be collected on site.

Table 1. Container Plants for Revegetation of Coyote Creek Reaches 1B and 2A

Scientific Name	Common Name	X Native to Site or Adjacent Property O Native to Southern California
Trees:		
Acer negundo ssp. *californicum*	California Box Elder	X
Platanus racemosa	Western Sycamore	X
Populus fremontii	Fremont Cottonwood	X
Salix laevigata	Red Willow	X
Salix lasiandra	Yellow Willow	X
Shrubs:		
Artemisia californica	California Sagebrush	X
Atriplex lentiformis var. *breweri*	Brewer's Saltbush	O
Baccharis pilularis var. *consanguinea*	Coyote Brush	X
Baccharis viminea	Mulefat	X
Rosa californica	California Rose	X
Rubus vitifolius	California Blackberry	X
Salix hindsiana	Sandbar Willow	X
Salix lasiolepis	Arroyo Willow	X
Sambucus mexicana	Elderberry	X
Herbaceous Plants:		
Chryopsis oregona	Golden Aster	X
Elymus Triticoides	Beardless Wild Rye	X
Baccharis douglasii	Douglas' Baccharis	X
Glycyrrhiza lepidota	Wild Licorice	X

Plant materials to be installed from container stock are currently being contract grown by several native plant nurseries and will be available at installation time. Container plants are being grown in five container sizes. These are: dee pots (2.5 inch × 10 inch plastic tube), tree bands (2 inch × 7 inch bottomless container), tree pots (4 inch × 4 inch × 13 inch plastic containers), 4 inch pots, and super stubbies (1.5 inch × 6 inch plastic tubes).

Table 2. Herbaceous Groundcover Plants to Be Seeded at Revegetation Sites in Reaches 1B and 2A

Scientific Name	Common Name	X Native to Site or Adjacent Property O Native to Santa Clara Valley
Herbaceous Plants:		
Achillea borealis ssp. *californica*	Common Yarrow	O
Atriplex patula var. *hastata*	Fat Hen	X
Baccharis douglasii	Douglas Baccharis	X
Barbarea orthoceras	American Winter Cress	O
Bromus carinatus	California Brome	X
Chrysopsis oregona var. *scaberrima*	Golden Aster	X
Elymus glaucus	Blue Wildrye	O
Elymus triticoides	Beardless Wildrye	X
Epilobium adenocaulon	Willowherb	X
Epilobium paniculatum	Parched Fireweed	X
Eschscholzia californica	California Poppy	X
Glycyrrhiza lepidota	Wild Licorice	X
Hemizonia pungens spp. *martima*	Common Spikeweed	X
Hordeum brachyantherum	Meadow Barley	X
Lasthenia glabrata	Salt Marsh Goldfields	X
Layia platyglossa	Tidy Tips	O
Linanthus grandiflorus	California Phlox	O
Lupinus bicolor	Pygmy-Leaved Lupine	O
Lupinus succulentus	Arroyo Lupine	X
Orthocarpus purpurascens	Owl's Clover	O
Phacelia ciliata	Great Valley Phacelia	O
Sidalcea malvaeflora	Wild Hollyhock	O
Spergularia marina	Saltmarsh Sand Spurry	X
Stipa pulchra	Purple Needlegrass	O

SUBSTITUTIONS

Plant substitutions may be made if the required number of propagules is not available for a species. Substitutions will be made by the Revegetation Consultants to the SCVWD, not the Revegetation Contractor. The required amount of plants is expected to be available from the nurseries to complete the project.

PLANTING DESIGN AND LAYOUT (PLANTING PLAN)

PLANT ASSOCIATIONS

The areas to be revegetated include a variety of habitats that require different species of plants, different propagules, and different variations of both.

The following lists describe the plant associations that are proposed for each of the revegetation areas. For all associations consisting of plants installed from containers, cuttings or transplants, the percentage figure given indicates the contribution of each species to the total number of plants installed.

Because of the high concentrations of sodium, boron, and other neutral soluble salts found in the soils, the species chosen for revegetation are those that are known to have relatively high salt tolerance among native riparian species. As noted above, certain species that are native to Santa Clara Valley riparian forests may not be listed here because of their known lack of salt tolerance.

Emergent Vegetation Association. If it is determined by Fall 1991 that bulrush and cattail have not colonized the channel banks in Reach 1B to a satisfactory density and distribution, active planting will be considered using the following mix of transplants.

Plant Name	Plants/Acre	Percent
Bulrush	3,348/ac	76%
Cattail	1,058/ac	24%

Willow Forest Association/Area 1B-3. The lowest bench on the east side of Island Area 1B-3 shall receive a seeded herbaceous groundcover and the following mix of container plants.

Plant Name	Plants/Acre	Percent
California Box Elder	70/ac	3%
Arroyo Willow	614/ac	26%
Sandbar Willow	190/ac	8%

Plant Name	Plants/Acre	Percent
California Blackberry	213/ac	9%
Fremont Cottonwood	70/ac	3%
Mulefat	95/ac	4%
California Rose	142/ac	6%
Coyote Brush	48/ac	2%
Douglas' Baccharis	213/ac	9%
Beardless Wildrye	237/ac	10%
Wild Licorice	119/ac	5%
Golden Aster	335/ac	15%

Mixed Riparian Forest Association/Area 1B-3. The higher of the 2 benches on the east side of Island Area 1B-3 shall receive a seeded herbaceous groundcover and the following mix of container plants.

Plant Name	Plants/Acre	Percent
Fremont Cottonwood	230/ac	17%
Arroyo Willow	150/ac	11%
Red Willow	27/ac	2%
California Box Elder	163/ac	12%
Blue Elderberry	95/ac	7%
Coyote Brush	109/ac	8%
Brewer's Saltbush	150/ac	11%
California Sagebrush	95/ac	7%
California Blackberry	204/ac	15%
Wild Licorice	109/ac	8%
Sandbar Willow	14/ac	1%

Mixed Riparian Forest Association/Area 1B-5. This area in Reach 1B shall receive a seeded herbaceous groundcover and the following mixture of container plants.

Plant Name	Plants/Acre	Percent
California Box Elder	255/ac	16%
Fremont Cottonwood	191/ac	12%

Plant Name	Plants/Acre	Percent
California Rose	199/ac	12.5%
Elderberry	207/ac	13%
California Blackberry	199/ac	12.5%
Red Willow	48/ac	3%
Arroyo Willow	303/ac	19%
Coyote Brush	96/ac	6%
California Sagebrush	80/ac	5%

Mixed Riparian Forest Association/Areas 2A-1 through 2A-5. Five areas in Reach 2A shall receive a seeded herbaceous ground cover and the following mixture of container plants and cuttings.

Plant Name	Plants/Acre	Percent
Western Sycamore	49/ac	3%
California Box Elder	114/ac	7%
Fremont Cottonwood	615/ac	38%
Elderberry	49/ac	3%
Arroyo Willow	388/ac	24%
Red Willow	324/ac	20%
Yellow Willow	81/ac	5%

AMOUNT OF PLANT PROPAGULES REQUIRED

The amount of plant propagules and the type of propagule required for each species to be installed from containers or cuttings is given in Table 3. Refer to Figure 4 for the plant list showing amounts of each species to be used in each revegetation area.

Table 3. Amount of Container Plants and Cuttings Required for Coyote Creek Reaches 1B and 2A

Commmon Name	Container Type	Amount Required
Trees:		
California Box Elder	Dee pot	250
Fremont Cottonwood	Dee pot	158
Fremont Cottonwood	Short cutting	55
Fremont Cottonwood	Pole cutting	423
Western Sycamore	Tree pot	53
Red Willow	Dee pot	22
Red Willow	Short cutting	35
Red Willow	Pole cutting	212
Yellow Willow	Short cutting	24
Shrubs:		
Arroyo Willow	Dee pot	367
Arroyo Willow	Short cutting	103
Brewer's Saltbush	Dee pot	62
California Blackberry	Tree band	208
California Sagebrush	Dee pot	54
California Rose	Dee pot	92
Coyote Brush	Dee pot	83
Elderberry	Dee pot	135
Mule Fat	Dee pot	40
Sandbar Willow	Dee pot	83
Herbaceous Plants:		
Golden Aster	4" pot	144
Beardless Wildrye	Liner	92
Douglas' Baccharis	4" pot	83
Wild Licorice	4" pot	93

INSTALLATION GUIDELINES

PURCHASE, TRANSPORT AND STORAGE OF PLANT MATERIALS

Live plant materials (container plants) are being ordered and purchased by the SCVWD. They are being contract-grown and, as a result, the SCVWD is assured of receiving a complete plant order at the appropriate time. In addition, contract growing assures that the plants will be grown in the specified container types and not be root-bound. The SCVWD Revegetation Consultant will make at least one visit to the contract nurseries and check the quality of the container plants being grown for this project.

Plants will be delivered to the project site at the specified time by the nurseries. The plants shall be inspected by the Revegetation Contractor, the Revegetation Consultant and the SCVWD Engineer at the time of delivery.

Once approved, the plants shall be the responsibility of the Contractor. Plants will be kept moist and safe from vandalism, animal, or other damage at all times.

The Contractor will be allowed to maintain a temporary nursery on-site, which shall be fenced to exclude animals.

The commercially available seed required for this project will be ordered and purchased by the SCVWD. Other seed will be custom collected. Commercially obtained seeds will be delivered to the project site and inspected by the Revegetation Contractor, the Revegetation Consultant, and the SCVWD Engineer for approval. Once approved, the seed shall be the responsibility of the Contractor. The seed shall be properly stored and kept dry, out of direct sunlight, and safe from animal or other damage.

INSTALLATION OF HERBACEOUS GROUNDCOVER BY SEEDING

Early Fall sowing of seed is necessary so that the seed is in contact with the soil while the soil and air temperatures are relatively warm to encourage seed germination. Fall germination will allow seedlings to become well established before the dry season. Seeding should be completed by October 31, 1990.

All seeds shall meet minimum standards for purity and germination. Legume seed shall be freshly inoculated with the proper *Rhizobium* (nitrogen-fixing) bacteria.

All seeding shall be done by hand broadcasting after preparation of the seedbed. Ammonium phosphate fertilizer (16-20-0), at the rate of 250 pounds per acre, shall be applied. The seeds and fertilizer shall be incorporated into the soil with a cultipacker, followed by the application of straw mulch at the rate of 2000 pounds per acre. This seeding method will be applied in all areas.

INSTALLATION OF CONTAINER PLANTS, CUTTINGS, AND TRANSPLANTS

Specifications and drawings for this contract will be available to bidders in winter of 1991. Installation of the container plants in Reach 1B shall be implemented in the Spring of 1991. Irrigation of planted areas will ensue immediately following installation. During the life of the Maintenance Contract Period for Reach 1B, the Revegetation Contractor shall bear the responsibility of meeting the water requirements of installed plants as outlined in the irrigation schedule in this document. Supplemental irrigation shall commence whenever soil moisture is determined to be inadequate by the Revegetation Consultant, the Revegetation Contractor and/or the SCVWD Engineer.

If active transplantation of bulrush and cattail into Reach 1B is deemed necessary (see Figure 3), rhizome clumps shall be installed on channel banks in a zone one foot above and below the summer water level and shall be planted the same day they are harvested. They will be planted in saturated soil and no irrigation will be required.

Hardwood cuttings shall be harvested and installed in Reach 2A while the source plants are dormant, typically December 15 through January 31.. Irrigation guidelines are the same as for container plants.

Refer to the Typical Planting Details (Figures 6-12) for a graphic representation of the planting methods to be used.

Planting locations will be flagged by the Revegetation Consultant prior to the installation of container plants by the Contractor. Flag stakes, 21 inches tall, will be used. A different color flag will be used for each species to be installed. A color code will be provided to the Contractor.

After the end of the Contract period, the SCVWD Facilities Maintenance Department will take over all maintenance tasks for this revegetation project.

WEED CONTROL

A three foot area will be kept clear of herbaceous plants around each tree and shrub. For the purposes of the revegetation project, all herbaceous plants growing within this three foot zone will be considered "weeds". Many of these same "weeds" are beneficial plants elsewhere in the seeded area, and in their proper place are to be encouraged.

To aid the establishment of trees and shrubs, weed control efforts will be required. At the time of planting, the Contractor shall clear a 3-foot by 3-foot area before excavating the planting pocket or basin. The soil used to backfill the planting holes shall also be as free of weeds, seed, and mulch as is possible. An organic mulch 3 inches deep shall be placed in the planting terrace or basin. (See planting details at the end of this report.)

PLANT PROTECTION

Plants shall be protected from browsing animals and insects by collars and screens as shown in Figures 6 and 7. The screen will additionally provide sun and wind protection for all container plants. Pole cuttings will be protected from browse damage by rigid seedling protection tubes (see planting details at the end of this report).

ESTABLISHMENT PERIOD MAINTENANCE

The establishment period starts immediately after plant installation and will continue for a minimum of three years.

IRRIGATION

Irrigation will be necessary for the establishment of all container stock and cuttings, except where the short cuttings will be installed within 3 feet of the water's edge on the creek banks.

Seeded herbaceous groundcover plants will not require supplemental watering. It is expected that some species of plants in the seed mix may not become established where conditions are harsh. It is expected that other species in the mix (or volunteers) that are adapted will take their place.

The watering regime will be such that weaning from irrigation occurs with time. The long-term goal is that no watering will be necessary after the establishment period. Irrigation will continue for a minimum of 1 year for the Willow Forest Association in Area 1B, and up to 3 years or more for plants in other areas. Only 1 year of irrigation is necessary on the low bench in Area 1B-3 (Willow Forest Association) because the bench is 2 feet above the seasonal lake and stays moist just below the surface for most of the year.

The proposed method of watering in Reaches 1B and 2A is by pumping from the seasonal lake and delivering the water to each individual plant through PVC main lines, polyethylene drip and distribution lines and via drip bubbler/emitters. The watering schedule is given in Table 4. A change in the schedule or amount of water per application shall be made only under the direction of the Revegetation Consultant. A permanent deep well turbine pump, and a supply-line channel crossing will supply irrigation for the entire project. The pump will be installed at the 14 foot elevation (above the 100-year flood zone) in Reach 1B.

Reclaimed water trucked from the San Jose/Santa Clara Water Pollution Control Plant will be used as needed during the establishment period when the seasonal dam is out.

Table 4. Proposed Irrigation Schedule*

YEAR 1:	**April** - As needed, based on rainfall.
	May through October - Plants shall be irrigated twice each week.
YEAR 2:	**April** - As needed, based on rainfall.
	May, June, and July - Plants shall be irrigated twice each week.
	August, September, and October - Plants shall be irrigated once each week.
YEAR 3:	**April** - As needed, based on rainfall.
	May - Plants shall be irrigated once each week.
	June through October - Plants shall be irrigated every two weeks.

* Subject to change as needed.

MAINTENANCE OF WATERING BASINS

Watering basins and planting terraces shall be kept functional (able to hold supplemental irrigation water) at all times during the establishment period. Basins that lose their water holding capacity due to berm dislodgment or any other reason shall be repaired. The Contractor shall be responsible for repairing the watering basins during the maintenance contract period, and the SCVWD shall be responsible after the contract period until the end of the establishment period.

WEED CONTROL

Weed control shall be performed by the Contractor during the establishment period around all the container plants and cuttings installed. Weeds that grow within the planting basins (and collars and screens) shall be hand pulled or mechanically removed before reaching 4 inches tall, or before covering 30% of the planting basins. Herbicides shall not be used within the watering basins or terraces or within 3 feet of tree or shrub plantings. Systemic herbicides which deactivate quickly with soil contact may be used on the most pernicious, perennial weeds outside these limits. These same herbicides may be used on other weeds if documentation can be provided which shows that the product has a negligible effect on soil biota.

PLANT PROTECTION

Plant protection shall be accomplished with collars and screens on all trees, shrubs and rigid seedling protection tubes on the cuttings. During the plant establishment period, plant protection tubes, collars and screens shall be kept functional and intact; it is not expected that additional plant protection will be required beyond securing collars, screens and protection tubes that become dislodged. Adjustments of the plant protection devices will be required to accommodate plant growth.

DEBRIS REMOVAL

Debris removal shall be ongoing throughout the establishment period. All trash and non-organic debris that accumulates on the site shall be removed from the site and disposed of off the site by the Contractor.

The collars, screens, and the above-ground portion of the irrigation system shall be removed and disposed of off the site when no longer necessary and/or the plants are established.

SUPPLEMENTAL PLANTING AND SEEDING

If necessary, supplemental planting will occur in the late Fall to early Winter of 1991. Supplemental seeding will be necessary for bare areas or for areas where the groundcover is thin. Plant substitutions may occur if certain species do not perform well. Species will be chosen based on the findings of the monitoring program and by area or association. Those species that established themselves well will be used. Selection and ordering of plants and seed for replanting will be the responsibility of the SCVWD. Bare areas shall be reseeded by roughing up the soil, seeding, raking, and applying straw mulch. Thinly covered areas shall be over-seeded using appropriate species. No raking, etc., will be required when overseeding.

MONITORING OF REVEGETATION SUCCESS

This section sets forth monitoring requirements for the revegetation areas during installation and the establishment period (3 years from the time of installation). Monitoring and maintenance of the area as a whole, including the revegetation beyond the establishment period, will be discussed separately in the Monitoring and Maintenance Program to be prepared for this area.

Inspection of the Contractor's performance shall take place during the contract work period and will be performed by the SCVWD Engineer with assistance from the Revegetation Consultant, who are familiar with the revegetation methodology and the plant materials being used for this project.

Monitoring of the revegetation project and inspection of Contractor performance during the Contract Period are necessary to achieve the following objectives:

1. Identify prevailing and potential problems early and implement remedial actions immediately.
2. Verify Contract performance and standards.
3. Verify plant establishment and achievement of established success criteria.
4. Comply with AB 3180, which was introduced to the State Senate in 1988, added to the Public Resources Code Section 21081.6 of the California State Law relating to CEQA and put into effect in January of 1989, providing for monitoring requirements of mitigation projects.
5. Determine the success of selected species so that appropriate species for supplemental planting and seeding can be utilized.

Generalized monitoring of the site by the Revegetation Consultant will occur once a month (more frequently if problems arise), from the time the Contractor starts through the end of the Establishment Period.

Periods of no rainfall for 3 weeks or more in the winter and spring will initiate monitoring of the site to assess the need for supplemental irrigation. Investigating the soil for moisture shall be accomplished by digging to a minimum depth of 4 inches below the soil surface. Moisture shall be adequate in the root zone for root growth to occur during the plant's dormant season or supplemental irrigation shall commence.

During the spring and summer growing season, moisture in the root zone will be monitored and shall be adequate to promote vigorous vegetative growth. The irrigation schedule will be adjusted, if necessary, based on monitoring results.

The soils of the project site will be analyzed once a year so that monitoring of the reduction of high concentrations of neutral soluble salts can be documented. Additional soil amendment may be added based on observed plant health problems and/or soil reports.

A yearly report will be prepared by the Revegetation Consultant during September of each of the 3 years of the establishment period which will detail plant survival including herbaceous plant success, the need for replanting or reseeding, remedial actions to be taken, and other relative information.

Monitoring for plant survival shall occur in April and August for the trees, shrubs, and herbaceous groundcovers. General growth data will be taken during April. Detailed survival/mortality data will be taken in August of each year.

SUCCESS CRITERIA

Seeded sites shall have a minimum of 60% cover in the first year. Supplemental seeding will occur throughout the establishment period if this criterion is not met. Areas of 6 feet in diameter or greater with less than 20% cover shall be reseeded with a new seed mix formulated after analysis of the success of the species in the original mix; areas with greater cover may only be overseeded.

Container stock and cuttings must survive to minimum percentages by category or be replaced. In Reach 2A, trees as a whole shall have a minimum 70% survival rate at the end of one year, 60% the second year, and 50% the third year or supplemental trees will be installed. Shrubs as a group shall also meet the above survival standards each year. However, herbaceous perennial groundcovers from containers will not be required to meet a survival criterion. The groundcovers that were sown from seed will be allowed to fill in any bare areas left by failed container stock groundcovers.

In Reach 1B the soil and water are significantly more saline and the soil is more compacted than in Reach 2A. Therefore, trees and shrubs will be required to attain only 60% survival the first year, 50% the second year, and 40% the third year without triggering replanting. As above, seeding will replace perennial groundcovers that fail.

More successful species of trees and shrubs within an association may be substituted for species which do poorly.

Survival rates of 50% and 40%, three years after planting, are lower than average for a riparian revegetation project. Nonetheless, these are reasonable objectives in light of the very harsh conditions prevailing at this site. Close spacing of plants was designed into the project so that even these low success rates would result in a riparian forest with acceptable number and acceptable spacing of plants.

As mentioned in the Constraints to Successful Revegetation section, the soil and water parameters may ultimately prevent the establishment of mature riparian trees and shrubs that will shade Coyote Creek with native vegetation, especially in Reach 1B. If this proves to be the case, the SCVWD shall consider the alternative of planting the area with saline-tolerant, non-invasive, non-native trees and shrubs that will meet the goal of shading the creek and will provide at least some wildlife values. This alternative, if considered, would first gain the approval of the regulatory agencies.

MONITORING OF SHADE LEVELS

A long-term monitoring program will be implemented to quantify the re-establishment of shading in the aquatic environment. Mean shade values were estimated for Reaches 1B and 2A in the summer of 1987, based upon density and height of trees, their location on the banks, height and slope of banks and the position of the summer sun. These values will be used as a baseline for comparison to current (1990) and future shade levels as the revegetation areas develop.

The sections of stream immediately upstream and downstream from the temporary dam site locations are currently sparsely vegetated or are devoid of vegetation as a result of the flood control project. Consequently, there is no shading in some ares. The eastern delta island (1B-3), Area 1B-5 across from the island, and five sites in Reach 2A (2A-1 through 2A-5) will be revegetated using groundcovers, trees and shrubs. Shade data collected during the subsequent years of the monitoring program will be compared to data collected this year (1990) in those areas which are presently unvegetated or are sparsely vegetated.

Just upstream of the delta islands is an area of remnant riparian vegetation which still provides some shading of the creek. This area, which is not scheduled for revegetation, will be monitored for comparison with the revegetated areas. The data thus obtained will provide an additional criterion for evaluating the success of the revegetation plan.

METHODS

In order to better quantify stream shade ratings, the monitoring program will follow the Stream Segment Shade (SSSHADE) model (Bartholow, 1988). Visual observation will also be used for comparison with shade estimation methods employed.

Since most of the data necessary to calculate a shade rating using SSSHADE must be measured from the center of the stream, the reaches will be sampled from a boat. It will be necessary for two persons to carry out the survey, one to operate the boat, the other to collect data. Shade will be measured at a sufficient number of stations to correlate the results of the monitoring program with the baseline shade values.

Shade monitoring will be conducted once per year, in July or August, when deciduous riparian trees are fully leafed out. Once a monitoring date is established in the first full year of monitoring (1990), this will be the date of monitoring in subsequent years. It is important to sample on or very close to the same date each year, since the results of the SSSHADE model are dependent upon the position of the sun.

RELATED MONITORING PROGRAMS

MONITORING OF GROUNDWATER QUALITY

A series of shallow groundwater monitoring wells have been installed in Reaches 1B and 2A and a monthly monitoring program (The Habitat Restoration Group, 1990) is being carried out during 1990. The data collected on depth to water, fluctuations in same, and concentration of dissolved salts has been used in Phase 2 revegetation species selection and will contribute to the analysis of revegetation monitoring data.

MONITORING OF IN-STREAM WATER QUALITY

Salinity, dissolved oxygen, and temperature are being monitored at several stations in Reaches 1B and 2A, from the tidal channel through the seasonal lake and upstream. The extent and direction of salt water intrusion upstream, the incremental readings of salinity throughout the water column in the seasonal lake, and the lake salinity conversion just after installation of the seasonal dam are being recorded. The channel water quality monitoring is being coordinated with the well monitoring. Data from both will be correlated with plant survival.

REFERENCES

Bartholow, John, 1989. Temperature Model Technical Note #3, Stream Segment Shade Model (SSSHADE) Version 1.4, Revised November, 1988.

California Department of Fish and Game, March 25, 1988, Agreement Regarding Proposed Stream or Lake Alteration Notification No. III-204-88 (Reach 1).

California Department of Fish and Game, June 28, 1988, Agreement Regarding Proposed Stream or Lake Alteration Notification No. III-1421-88 (Reach 2).

John Stanley and Associates, Inc., H.T. Harvey and Associates, Inc., and Kinnetic Laboratories, Inc., 1989. Lower Coyote Creek Fisheries Evaluation. Report for Santa Clara Valley Water District, San Jose, California.

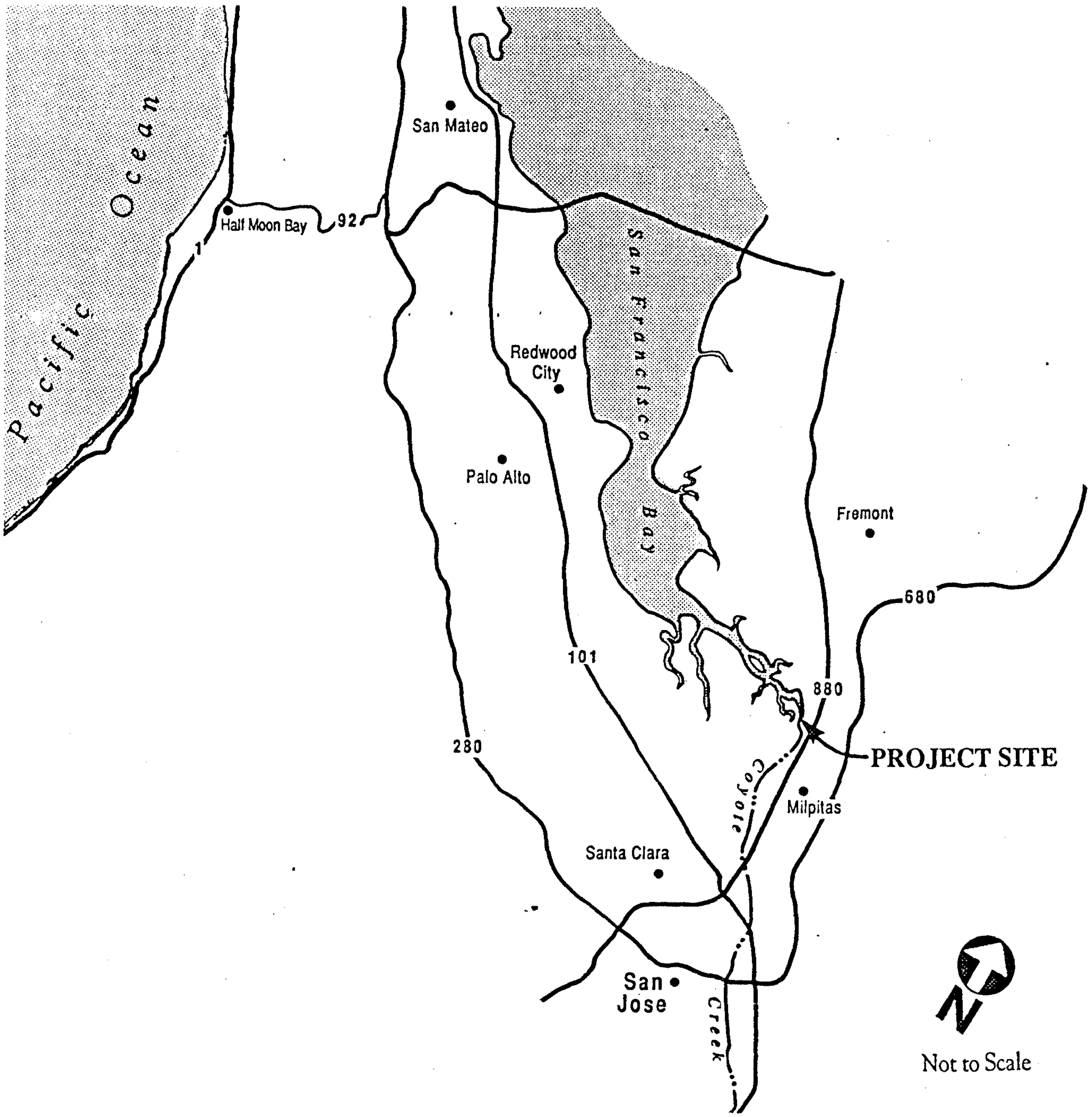
Santa Clara Valley Water District, 1984. Coyote Creek Planning Study and EIR.

SCVWD, August, 1989. Specifications and Contract Documents for Coyote Creek Reach 1; Revegetation Project from Leslie Salt Pond to Milpitas Sewage Treatment Plant - Phase 1.

The Habitat Restoration Group, 1990. Coyote Creek Water Quality Monitoring Program.

The Habitat Restoration Group, 1990. Lower Coyote Creek Flood Control Project Groundwater Monitoring Program: Reaches 1B and 2A.

U.S. Army Corps of Engineers, June 16, 1989. Department of the Army Permit No. 15336S12A (Reach 2 Construction).



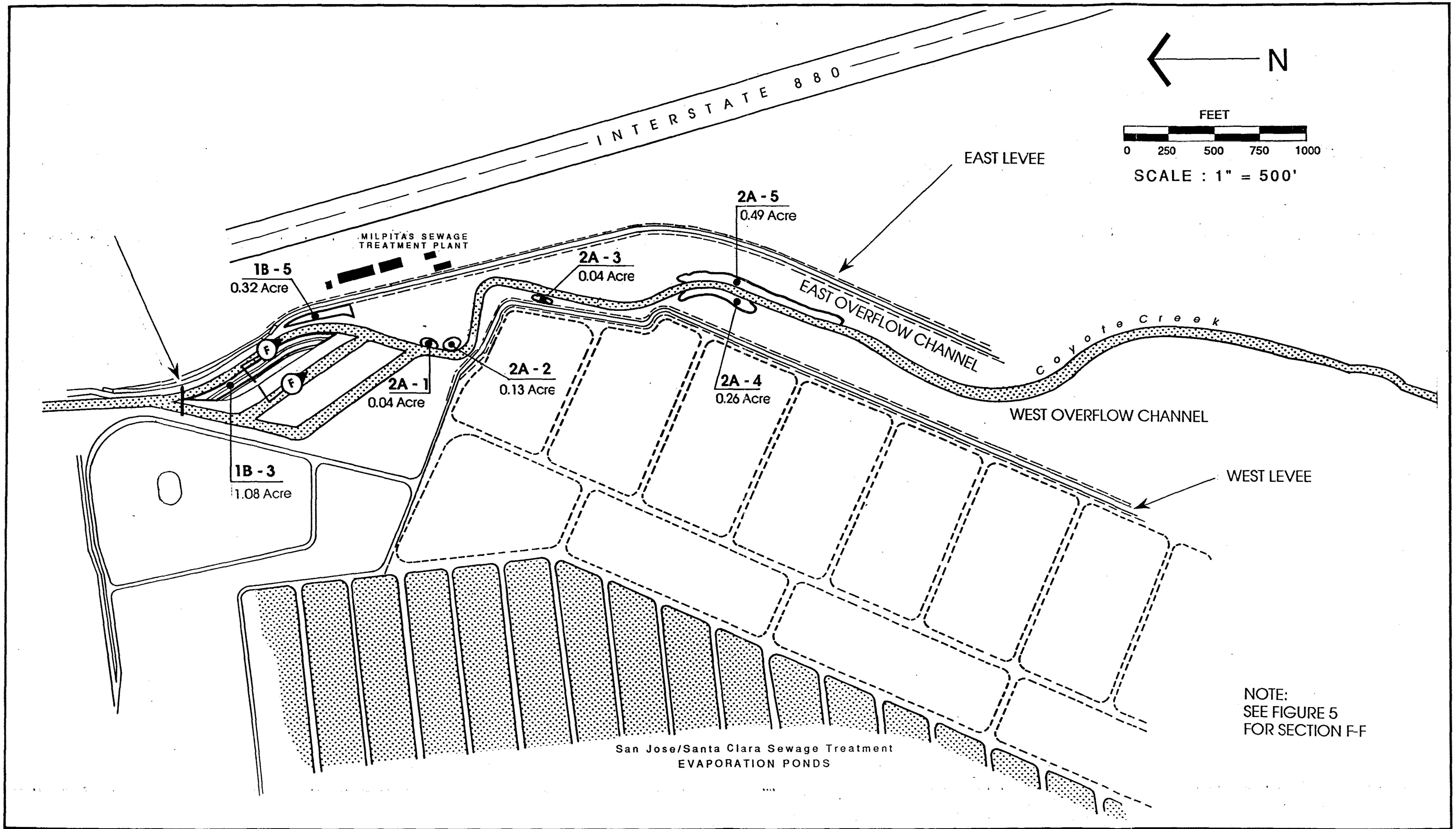
The Habitat Restoration Group

JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 1

COYOTE CREEK REACHES 1B & 2A
Vicinity Map

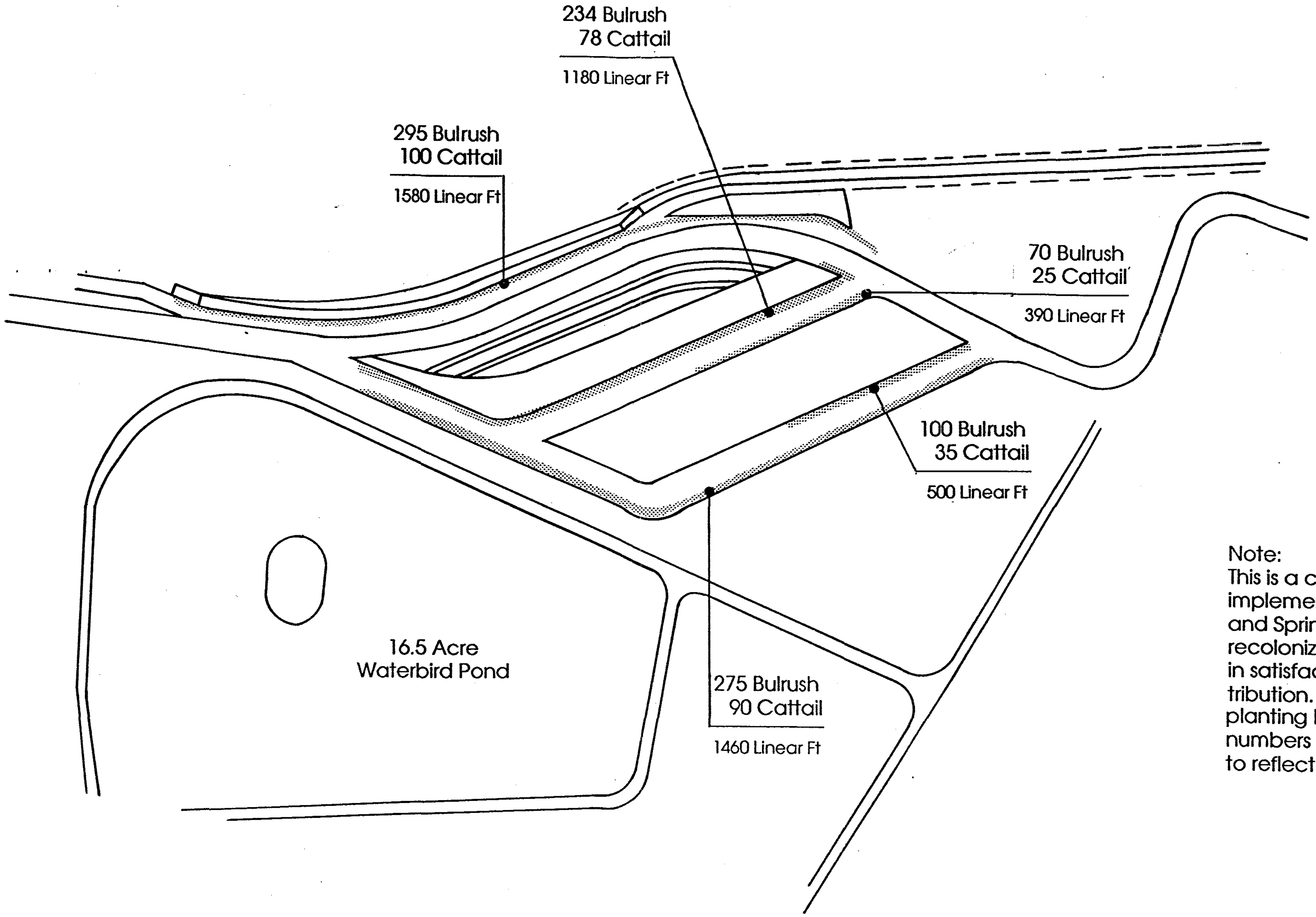
June 1990
182-33



The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066 • (408) 439-5500 • FAX (408) 438-1142

FIGURE 2
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan

June 1990
182-33



Note:
This is a contingency plan to be implemented between Fall 1991 and Spring 1992 if natural recolonization is not occurring in satisfactory density or distribution. After site analysis, planting locations and numbers will be adjusted to reflect existing conditions.

Not to Scale

The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066 • (408) 439-5500 • FAX (408) 438-1142

FIGURE 3
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan - Emergent Vegetation Areas

June 1990
182-33

PLANT LIST

COMMON NAME	BOTANICAL NAME	PROPAGULE	1B - 3	1B - 5	2A - 1	2A - 2	2A - 3	2A - 4	2A - 5	TOTAL
TREES										
Box Elder	*Acer negundo* ssp. *californicum*	Dee Pot	94	51	5	14	4	26	56	250
Fremont Cottonwood	*Populus fremontii*	Dee Pot	120	38						158
Fremont Cottonwood	*Populus fremontii*	Pole Cutting			18	57	17	108	223	423
Fremont Cottonwood	*Populus fremontii*	Short Cutting				16	11	12	16	55
Red Willow	*Salix laevigata*	Dee Pot	13		9					22
Red Willow	*Salix laevigata*	Pole Cutting			9	29	8	54	112	212
Red Willow	*Salix laevigata*	Short Cutting				10	7	8	10	35
Yellow Willow	*Salix lasiandra*	Short Cutting				8	5	5	6	24
Western Sycamore	*Platanus racemosa*	Tree Pot			2	7	2	14	28	53
SHRUBS										
California Sagebrush	*Artemisia californica*	Dee Pot	36	18						54
Brewer's Saltbush	*Atriplex lentiformis* ssp. *breweri*	Dee Pot	62							62
Coyote Brush	*Baccharis pilularis* ssp. *consanguinea*	Dee Pot	63	20						83
Mule Fat	*Baccharis viminea*	Dee Pot	40							40
California Rose	*Rosa californica*	Dee Pot	52	40						92
California Blackberry	*Rubus vitifolius*	Tree Band	168	40						208
Sandbar Willow	*Salix hindsiana*	Dee Pot	83							83
Arroyo Willow	*Salix lasiolepis*	Dee Pot	307	60						367
Arroyo Willow	*Salix lasiolepis*	Short Cutting				32	12	25	34	103
Blue Elderberry	*Sambucus mexicana*	Dee Pot	39	42	2	2	2	14	28	135
HERBACEOUS PERENNIALS										
Douglas' Baccharis	*Baccharis douglasii*	4" Pot	83							83
Golden Aster	*Chrysopsis oregona* var. *scaberrima*	4" Pot	144							144
Beardless Wildrye	*Elymus triticoides*	Super Stubby	92							92
Wild Licorice	*Glycyrrhiza lepidota*	4" Pot	93							93

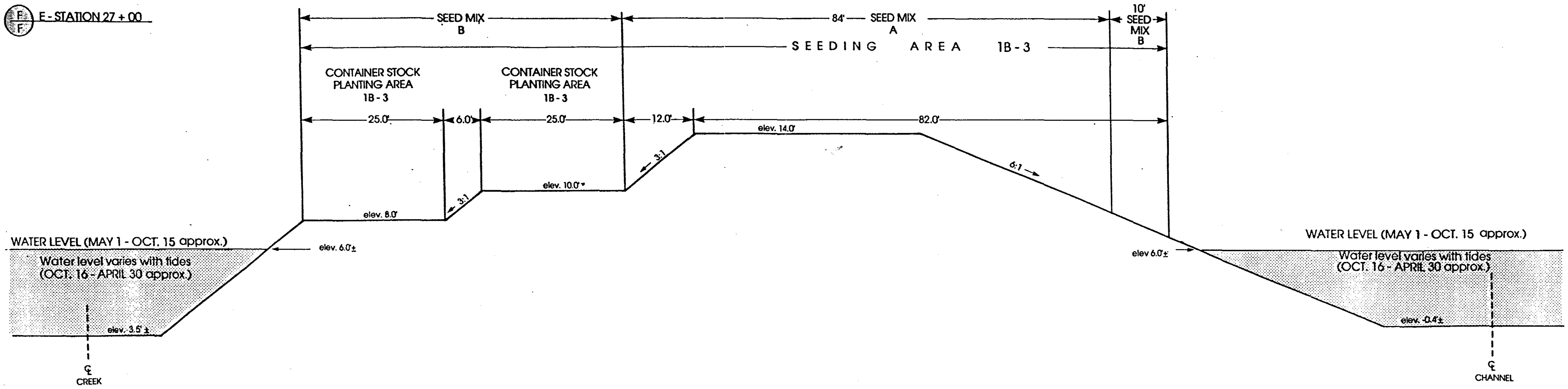
NOTES:
Dee Pot - 2.5" x 10" plastic tube (20tubes/rack)
Super Cell - 1.5" x 8" plastic tube (98 tubes/rack)
Tree Band - 2" x 7" bottomless container
Super Stubby - 1.5" x 6" plastic tube (98 tubes/rack)

The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066 • (408) 439-5500 • FAX (408) 438-1142

FIGURE 4

COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan - Plant List

JUNE 1990
182-33


F F
E - STATION 27 + 00
SEED MIX B
84' SEED MIX A
10' SEED MIX B
SEEDING AREA 1B - 3
CONTAINER STOCK PLANTING AREA 1B - 3
CONTAINER STOCK PLANTING AREA 1B - 3
25.0'
6.0'
25.0'
12.0'
82.0'
elev. 14.0'
3:1
6:1
3:1
elev. 10.0'
elev. 8.0'
WATER LEVEL (MAY 1 - OCT. 15 approx.)
Water level varies with tides
(OCT. 16 - APRIL 30 approx.)
elev. 6.0'±
elev. -3.5'±
℄ CREEK
WATER LEVEL (MAY 1 - OCT. 15 approx.)
elev 6.0'±
Water level varies with tides
(OCT. 16 - APRIL 30 approx.)
elev. -0.4'±
℄ CHANNEL

(NOT TO SCALE)

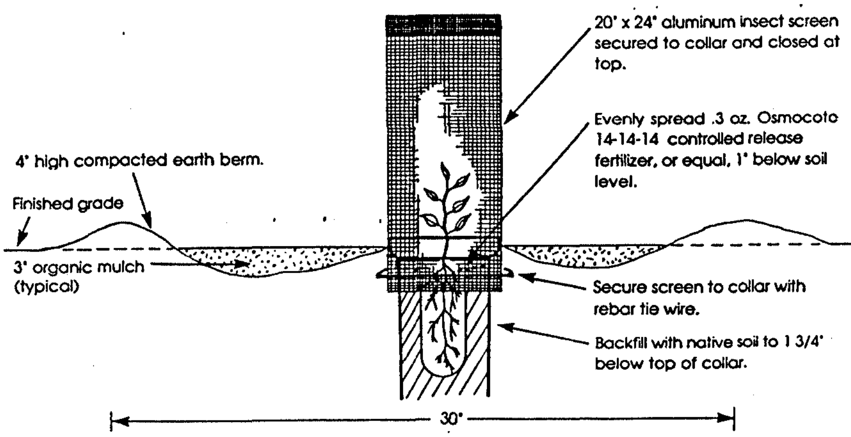
The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066 • (408) 439-5500 • FAX (408) 438-1142

FIGURE 5
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan - Cross Section F-F

June 1990
182-33

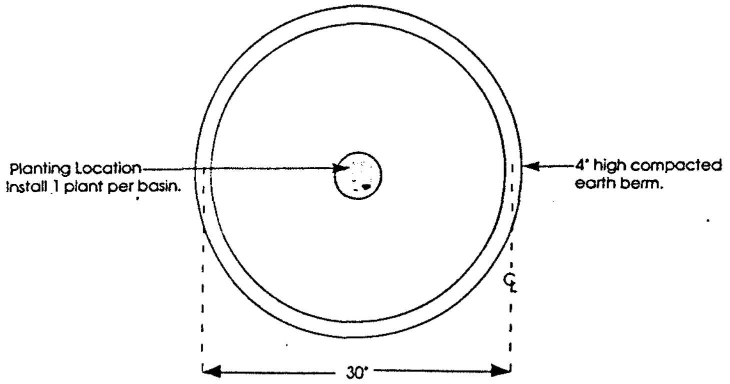
PLANTING METHOD #1
Collar and Screen Planting on Level Ground

SECTION


20" x 24" aluminum insect screen secured to collar and closed at top.
Evenly spread .3 oz. Osmocote 14-14-14 controlled release fertilizer, or equal, 1" below soil level.
4" high compacted earth berm.
Finished grade
3" organic mulch (typical)
Secure screen to collar with rebar tie wire.
Backfill with native soil to 1 3/4" below top of collar.
30"

Notes:
1) A 3' square area shall be cleared of weeds, seeds and mulch prior to constructing the planting terrace.
2) Planting basin shall be 30" diameter.
3) Bottom of screen shall be 3" below grade.
4) Soil level inside and outside the collar shall be equal.
5) Open top of screen when plant is 4" from top. Open side of screen when branches begin to be constricted.
6) Remove collar and screen at end of contract period.

PLAN VIEW



Not to Scale

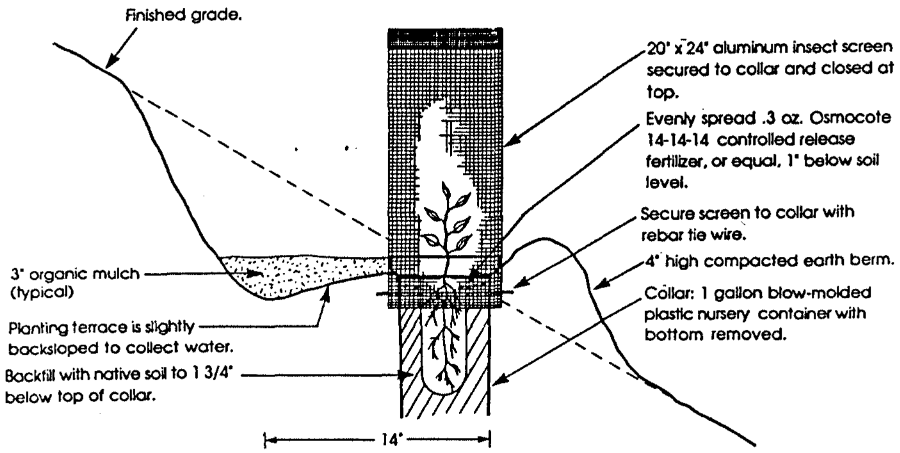
The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 6
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Method #1 on Level Ground

JUNE 1990
182-33

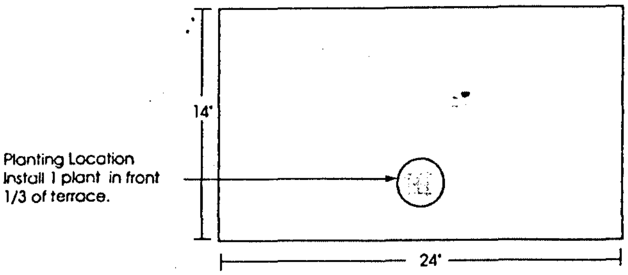
PLANTING METHOD #1
Collar and Screen Planting on Slope

SECTION


Finished grade.
20" x 24" aluminum insect screen secured to collar and closed at top.
Evenly spread .3 oz. Osmocote 14-14-14 controlled release fertilizer, or equal, 1" below soil level.
Secure screen to collar with rebar tie wire.
4" high compacted earth berm.
Collar: 1 gallon blow-molded plastic nursery container with bottom removed.
3" organic mulch (typical)
Planting terrace is slightly backsloped to collect water.
Backfill with native soil to 1 3/4" below top of collar.
14"

Notes:
1) A 3' square area shall be cleared of weeds, seeds, and mulch prior to excavating planting terrace.
2) Root crown shall be at finished grade, inside and outside of the collar.
3) Bottom of screen shall be 3" below grade.
4) Open top of screen when plant is 4" from top. Open side of screen when branches begin to be constricted.
5) Compacted berm shall be maintained intact to retain water during entire contract period.

PLAN VIEW



Not to Scale

The Habitat Restoration Group

JOHN STANLEY & ASSOCIATES, INC.

6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

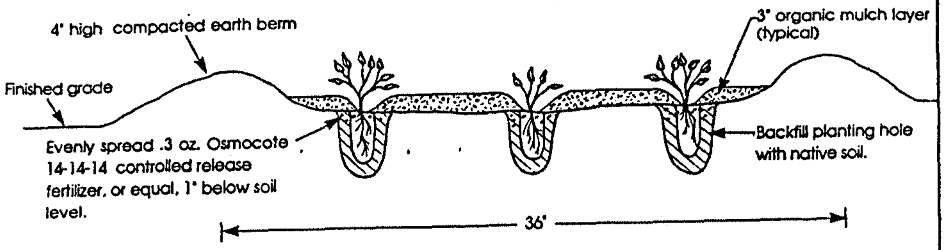
FIGURE 7

COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Method #1 on Slope

JUNE 1990
182-33

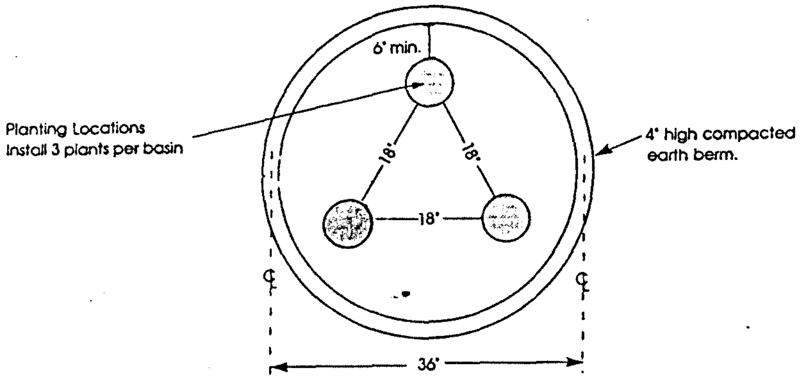
PLANTING METHOD #2
Multiple Perennial Planting on Level Ground

SECTION


4" high compacted earth berm
3" organic mulch layer (typical)
Finished grade
Evenly spread .3 oz. Osmocote 14-14-14 controlled release fertilizer, or equal, 1" below soil level.
Backfill planting hole with native soil.
36"

NOTES:
1) A 3' square area shall be cleared of weeds, seeds, and mulch prior to constructing the planting basin.
2) Root crown shall be at finished grade.
3) Compacted berm shall be maintained intact to retain water during entire contract period.

PLAN VIEW



Not to Scale

The Habitat Restoration Group

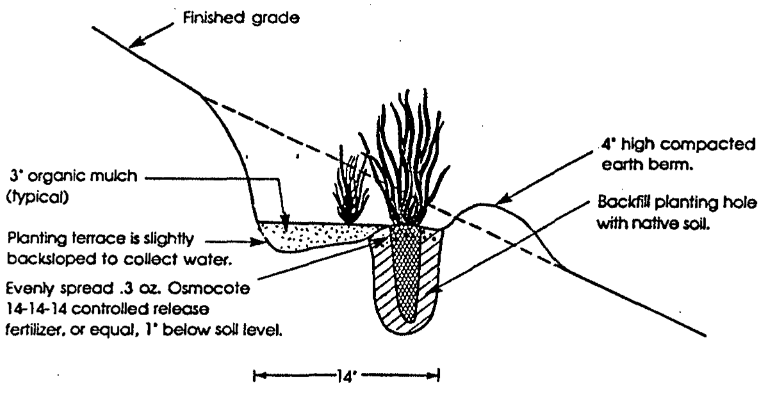
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 8
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Method #2 on Level Ground

JUNE 1990
182-33

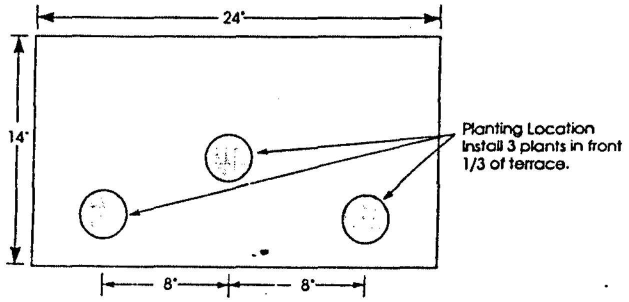
PLANTING METHOD #2
Multiple Herbaceous Perennial Planting on Slope

SECTION


Finished grade
3" organic mulch (typical)
Planting terrace is slightly backsloped to collect water.
Evenly spread .3 oz. Osmocote 14-14-14 controlled release fertilizer, or equal, 1" below soil level.
4" high compacted earth berm.
Backfill planting hole with native soil.
14"

NOTES:
1) A 3' square area shall be cleared of weeds, seeds, and mulch prior to excavating the planting terrace.
2) Root crown shall be at finished grade.
3) Compacted berm shall be maintained intact to retain water during entire contract period.

PLAN VIEW



Not to Scale

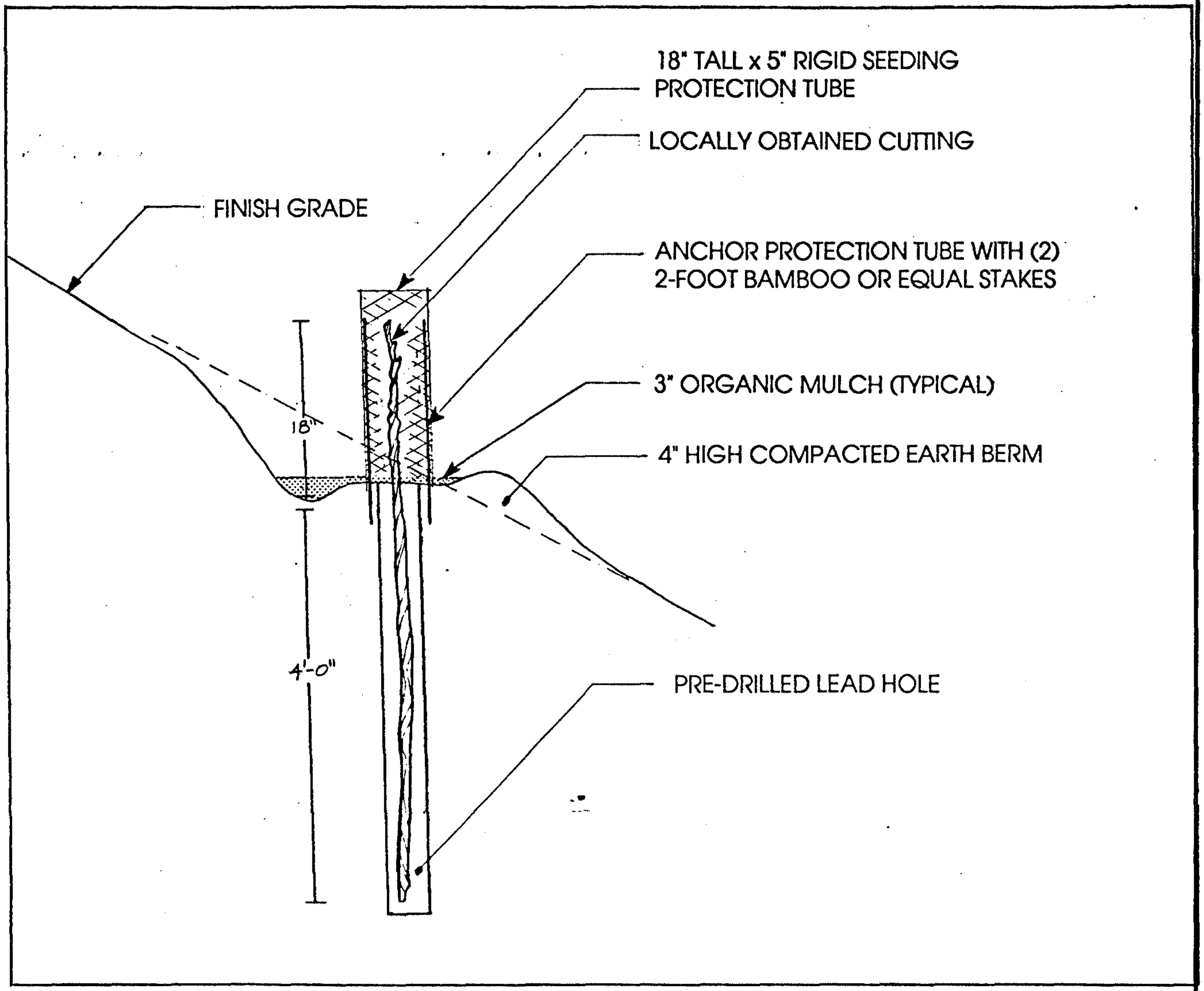
The Habitat Restoration Group

JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 9
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Method #2 on Slope

JUNE 1990
182-33

PLANTING DETAIL
Pole Cutting Planted on Slope


18" TALL x 5" RIGID SEEDING PROTECTION TUBE
LOCALLY OBTAINED CUTTING
FINISH GRADE
ANCHOR PROTECTION TUBE WITH (2) 2-FOOT BAMBOO OR EQUAL STAKES
3" ORGANIC MULCH (TYPICAL)
4" HIGH COMPACTED EARTH BERM
18"
4'-0"
PRE-DRILLED LEAD HOLE

Not to Scale

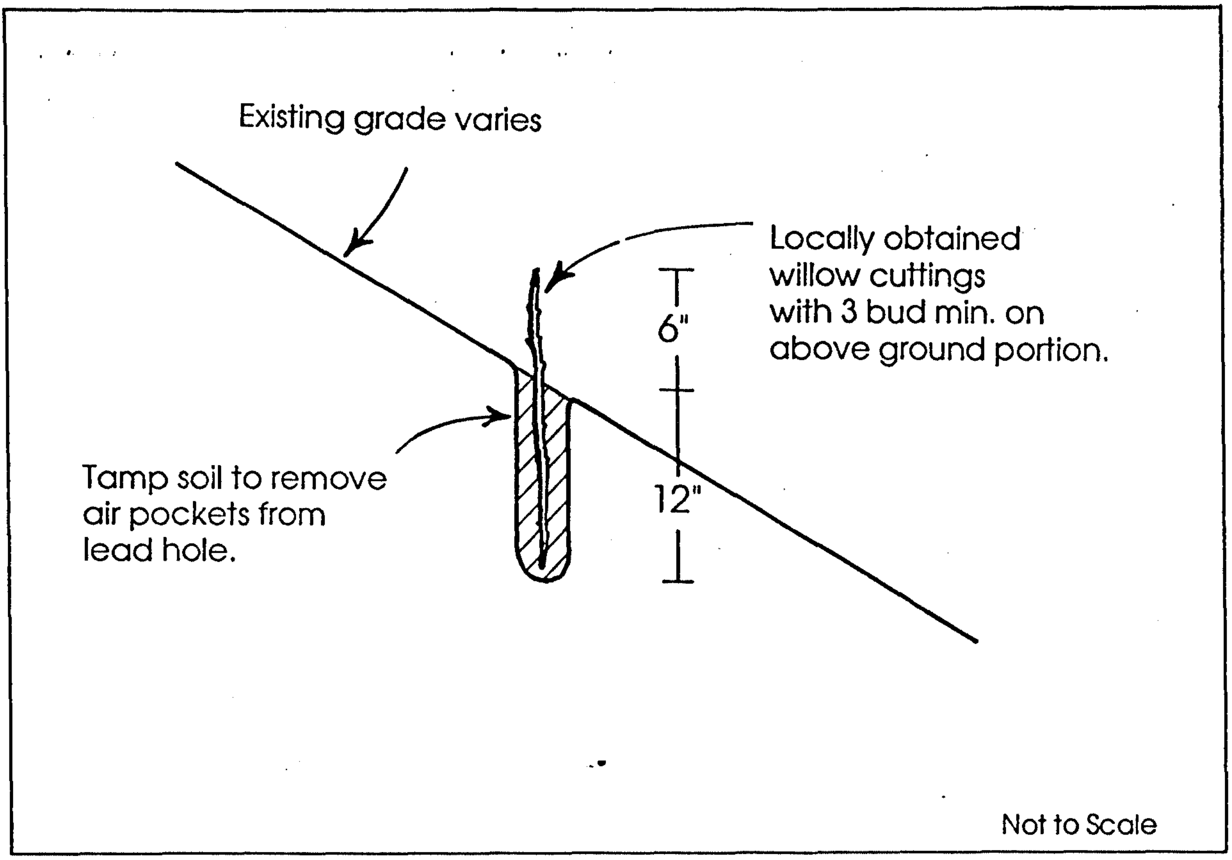
The Habitat Restoration Group

JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 10
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Pole Cutting on Slope

JUNE 1990
182-33

PLANTING DETAIL
Short Cutting Planted on Slope


Existing grade varies
Locally obtained willow cuttings with 3 bud min. on above ground portion.
6"
12"
Tamp soil to remove air pockets from lead hole.
Not to Scale

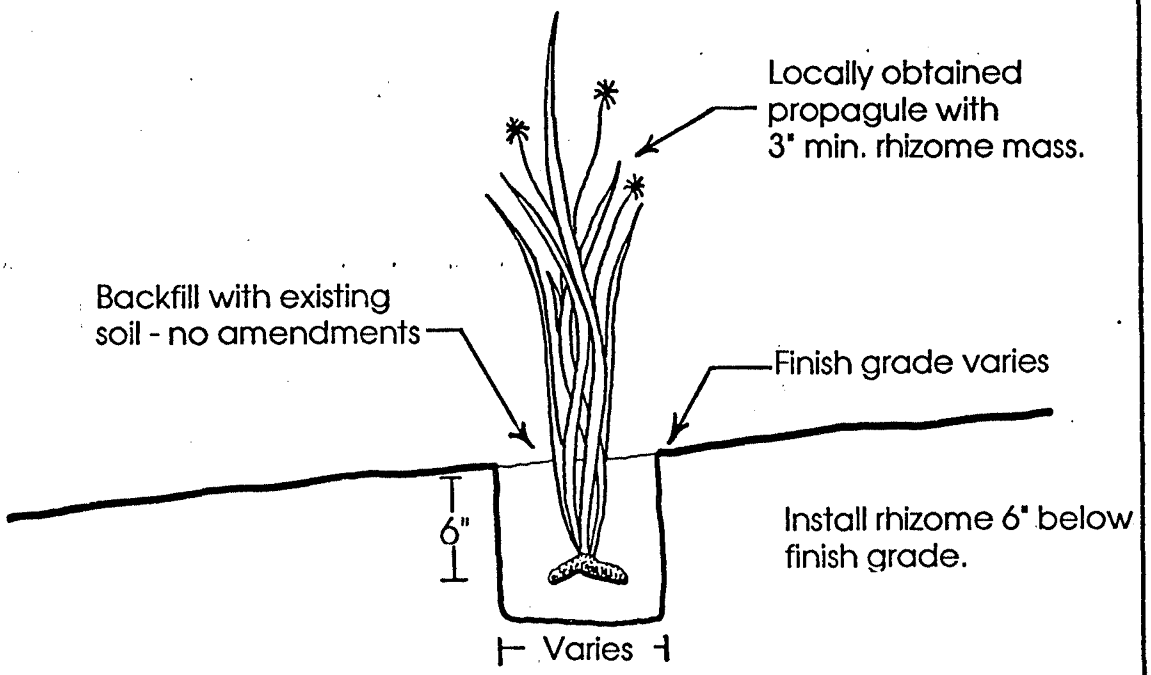
Not to Scale

The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 11
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Short Cutting on Slope

JUNE 1990
182-33

EMERGENT VEGETATION


Locally obtained propagule with 3" min. rhizome mass.
Backfill with existing soil - no amendments
Finish grade varies
6"
Install rhizome 6" below finish grade.
Varies

Not to Scale

NOTES:

1. Excavate planting hole sufficient to receive tule plant and rhizome.
2. Proposed finish grade varies.
3. Collect tules from healthy populations on adjacent sites.
4. Install tules on same day as collected.
5. Keep tule rhizome moist and protected from sunlight and wind from time of collection to time of installation.
6. Collect tules in discontinuous patches to avoid excessive disturbance to existing populations.

The Habitat Restoration Group
JOHN STANLEY & ASSOCIATES, INC.
6001 Butler Lane, Suite 1 • Scotts Valley, CA 95066
(408) 439-5500 • FAX (408) 438-1142

FIGURE 12
COYOTE CREEK REACHES 1B & 2A
Riparian Revegetation Plan
Detail - Emergent Vegetation

JUNE 1990
182-33